

concentration between about 0.05 percent by weight to about 5 percent by weight of the total weight of the heat transfer fluid.

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As required by 37 C.F.R. § 1.121, a marked up version of amended claims 1, 14 and 27 showing all changes relative to the previous version of these claims is attached to this Amendment and Response to First Office Action.

Remarks

Claims 1-50 are pending in this application. Claims 1, 14, 15, 27, 28 and 29 have been amended, and claims 30-50 are new claims. Support for new claims 30-50 can be found in the specification at, *inter alia*, page 12, lines 2-9; page 15, line 8 to page 17, line 22; page 21, line 5 to page 25, line 21; and page 29, line 21 to page 33, line 8. No new matter has been added.

Claims 1-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Meyers et al., U.S. Patent No. 5,118,434. Claims 1-29 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Maes et al., U.S. Patent No. 5,366,651. Claims 1-29 have also been provisionally rejected under the judicially created doctrine of double patenting over claims 1-5 of co-pending application Serial No. 09/877,306. The Examiner's grounds for rejection are hereinafter traversed and reconsideration is respectfully requested.

As described in the specification and recited in the claims as amended, the present invention relates to a non-aqueous heat transfer fluid which includes ethylene glycol and a diol which reduces the toxicity of ethylene glycol, such as propylene glycol. As described in the specification at pages 5-6, ethylene glycol based heat exchange fluids

can present a significant hazard to the environment due to their oral toxicity. The present invention relates to the addition of a diol, such as propylene glycol, to ethylene glycol based heat exchange fluids to reduce the oral toxicity of the heat exchange fluid. As recited in the claims, the heat exchange fluid may also include various additives, such as corrosion inhibitors, which are soluble in both ethylene glycol and the diol added to reduce the toxicity of the heat transfer fluid. Moreover, as described in the specification at page 23, lines 14-17, and as clarified in the amended claims, the heat transfer fluid of the present invention is non-aqueous, and it can be used as a heat transfer fluid without the addition of any water.

Claims 1, 14, 15, 27, 28 and 29 have been amended to clarify that the heat transfer fluid of the present invention is non-aqueous and it is intended to be used without the addition of water. These claims have also been amended to clarify that the present invention relates to the addition of a diol, such as propylene glycol, in the ethylene glycol-based heat transfer fluid to inhibit the toxic effects of ethylene glycol in the event that the fluid is ingested by an animal or human. These amendments are supported in the specification at, inter alia, page 14, line 21 to page 15, line 5, and at page 20, lines 1-11.

The Examiner's rejections under 35 U.S.C. § 103(a) are respectfully traversed based upon the clarifying amendments to the claims described above. Meyer, U.S. Patent No. 5,118,434 describes deicing solutions comprising alkylene glycols, water, corrosion inhibitors, and one or more polymeric additives. Meyer states at Column 2, lines 58-61 that the composition contains "up to 50 percent water" and preferably between 1 and 10 percent water by weight. The composition described by Meyer is intended to prevent precipitation of materials contained in the composition, and precipitation of materials contained in water that may be mixed with the composition.

According to the Examiner, Meyer's description of the composition as containing "up to 50 percent" water would include a composition containing no water. This view of the invention described in Meyer is erroneous. The composition described in Meyer requires the presence of water to maintain the additives described therein in solution. Indeed, Meyer states at Col. 2, lines 59-61 that the composition preferably contains between about 1 and 10 percent by weight water. As clarified in the new and amended claims, and as described in the specification, the composition of the present invention is non-aqueous, which is defined in the specification as meaning that there is no added water, and that water is present only as an impurity. The only additives present in the composition of the present invention are soluble in ethylene glycol and the second diol. Meyer does not teach or suggest a composition having no added water such as the composition recited in the new and amended claims.

Maes et. al., U.S. Patent Number 5,366,651, describes antifreeze concentrates for use in aqueous solutions. Because the composition described in Maes is an "antifreeze," by definition it is a composition which is added to water to prevent the water from freezing. Col. 1, lines 8-10. As described at col. 3, line 65 to col. 4, line 8, the major component of the antifreeze concentrate described in Maes is a water soluble liquid alcohol freezing point depressant. While Maes lists several liquid alcohols which may be used in the antifreeze concentrate, Maes does not teach or suggest use of more than a single liquid alcohol freezing point depressant in the composition. All of the exemplary compositions described by Maes include only ethylene glycol as a freezing point depressant, and the claims recite an antifreeze concentrate comprising "a water soluble liquid alcohol freezing point depressant...." (emphasis added). Maes does not teach or suggest the combination of ethylene glycol with any other diol, much less the

combination of ethylene glycol with a diol that reduces the oral toxicity of ethylene glycol as recited in the claims. Moreover, Maes does not teach or suggest the use of an ethylene glycol-based fluid as a non-aqueous heat transfer fluid, as recited in the amended claims.

The Examiner's provisional nonstatutory double patenting rejection is respectfully traversed in view of the amendments made herein. The amended claims clarify that the composition of the present invention is non-aqueous, and is to be used without the addition of any water. The composition described in co-pending Application No. 09/877,306 is used in combination with water. Accordingly, the scope of the claims of the two applications is not identical.

In view of the foregoing, it is respectfully submitted that Claims 1-50 are allowable. Accordingly, favorable action on this application is requested at the earliest possible date. Should the Examiner have any questions regarding this Response or should the Examiner wish to discuss this case further, the Examiner is urged to contact the undersigned attorney at the telephone number listed.

A check in the amount of \$273 is enclosed for payment of the additional filing fee required for examination of the application including the new claims added in this Amendment. A petition for a one month extension of time and the associated fee is being filed herewith. No additional fee is believed to be required. However, if a fee is required or otherwise necessary to cover any deficiency in fees paid, authorization is hereby given to charge our Deposit Account No. 50-1631.

Respectfully submitted,

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Eric E. Grondahl
Reg. No. 46,741

PTO Correspondence Address:

Cummings & Lockwood
Granite Square
700 State Street
P.O. Box 1960
New Haven, CT 06509-1960
Phone: (860) 275-6704
Fax: (860) 560-5987

Marked Up Version of Amended Claims

1. (Amended) A diol based, reduced toxicity, non-aqueous heat transfer fluid for use in a heat exchange system, said heat transfer fluid comprising:

- (a) a first diol consisting of ethylene glycol;
- (b) at least one second diol, wherein the second diol acts as an inhibitor [antidote] for ethylene glycol poisoning when it is mixed with ethylene glycol, and wherein the second diol has a boiling point above approximately 150°C; and
- (c) at least one corrosion inhibitor additive that is soluble in the first and second diols.

14. (Amended) A diol based, reduced toxicity, non-aqueous heat transfer fluid for use in a heat exchange system comprising at least one diol having a boiling point above approximately 150°C, and means for providing an inhibitor [antidote] for ethylene glycol poisoning when it is mixed with ethylene glycol.

15. (Amended) The heat transfer fluid of claim 14, wherein the [antidote] ethylene glycol poisoning inhibitor is propylene glycol.

27. (Amended) A method [for rendering] to reduce the toxicity of an ethylene glycol based, non-aqueous heat transfer fluid [non-toxic] comprising the steps of:

- (a) providing an ethylene glycol based heat transfer fluid; and
- (b) adding a sufficient amount of a diol that acts as an inhibitor [antidote] for ethylene glycol poisoning when it is mixed with ethylene glycol to [render] reduce the toxicity of the heat transfer fluid [non-toxic].

28. (Amended) The method of claim 27, wherein the diol that acts as an [antidote] inhibitor for ethylene glycol poisoning comprises at least about 30 percent by weight of the heat transfer fluid.

29. (Amended) The method of claim 28, wherein the diol that acts as an [antidote] inhibitor for ethylene glycol poisoning is propylene glycol.

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